Rylander R

Publications, Abstracts, and Presentations supported by CIAR

1. Rylander R, K Persson, H Goto, K Yuasa and S Tanaka. 1992. Airborne B-1,3 glucan may be related to symptoms in sick buildings. Indoor Environment 1:263-267.

2. Rylander R and K Persson. 1991. Airborne B-1,3 glucans in sick buildings. ATS Abstract. Am Rev Resp Dis. 143:A89.

3. Rylander R and K Persson. Glucan and symptoms in Hult school 1990-91. Dep Env Med Report. March, 1991.

4. Rylander R and H Goto. Organic Dust Committee report, April, 1991. First glucan inhalation toxicity workshop, October, 1990.

5. Rylander R, Persson K, Goto H and Yuasa K. 1991. Sick building symptoms and levels of airborne glucan. In Jacobs RR, Wakelyn PJ and Domelsmith LN (eds). National Cotton Council of America, Memphis, TN, pp 236-238.

6. Rylander R. (1992) Recent experiences on effects of endotoxin and B-1,3 glucan in indoor air. Presented at XVI Cotton Dust Research Conference, Nashville, TN, Jan 9-10.

7. Rylander R and Y Peterson. 1992. Recent experiences on effects of endotoxin and B-1,3 glucan in indoor air. In: Domelsmith LN, RR Jacobs, and PJ Wakelyn (eds.), 16th Cotton Dust Research Conference, National Cotton Council, Memphis, TN, pp 288-289.

8. Rylander R. (1993) A perspective on indoor air microbiological contamination. Presented at Conference on Building Design, Technology and Occupant Well-being in Temperate Climates, Brussels, Belgium, Feb 17-19.

9. Rylander R. (1993) Experimental exposures to (1 3)-B-D-glucan. Presented at Conference on Building Design, Technology and Occupant Well-being in Temperate Climates, Brussels, Belgium, Feb 17-19.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Improved Control Strategies for Effective Ventilation with Variable Air Volume Systems

PI: Harry J. Sauer, Jr., Ph.D.
University of Missouri-Rolla

The investigators will expand on the existing ASHRAE 590-RP methodology to develop the necessary tools for properly sizing and controlling the components in VAV systems for effective ventilation and associated indoor air quality while minimizing energy usage. Results will provide the design engineer with guidance in selecting the optimal sizes and types of fans, dampers, VAV boxes, and ducts for maintaining required air quantities, proper building pressures, and minimum energy consumption.

Contract No.	93-03		
Contract Execution Date	1/1/93		
Contract End Date	12/31/93		
No Cost Extension			
Budget	$51,348	$61,387	$53,150
Budget Amendment			
Five month report due	5/93		
Five month report received			
Site visit (anticipated)			
Site visit (conducted)			
Ten month report due	10/93		
Ten month report received			
Continuation approved			

STATUS: March 1993

Contract fully executed 3/12/93

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Evaluation of Effectiveness of Portable Indoor Air Cleaning Systems

PI: **Richard L. Shaughnessy, Ph.D.**
University of Tulsa
Center for Environmental Research and Technology

This project will evaluate the effectiveness of selected console-type portable air cleaners by measuring the clean air delivery rate (CADR) in removal of the following parameters: dust particulate matter, tobacco smoke, pollen, viable and total fungal spores, and gaseous contaminants (specifically carbon monoxide, nitrogen dioxide, nicotine and formaldehyde). Chamber studies will be conducted in accordance with a modified version of the Association of Home Appliance Manufacturers (AHAM) test procedures and will be followed by sensory perception studies.

Contract No.	90-26		
Contract Execution Date	7/26/90	Work Start Date	9/1/90
Contract End Date	1/31/92	(Note: 17 month contract)	
No Cost Extension	3/15/92		

Budget	$181,406
Budget Amendment	

Five month report due	2/1/91
Five month report received	2/4/91

Site visit (anticipated)	
Site visit (conducted)	5/14/90 (preliminary visit) 8/16/91

Ten month report due	7/1/91
Ten month report received	8/14/91
Final report due	3/15/92
Final report received	11/2/92

STATUS: August 1991

The following contaminants have been studied with respect to individual air cleaner removal: formaldehyde, dust, tobacco smoke particulate, and vapor-phase tobacco smoke constituents (nicotine and vinyl pyridine). In addition, ozone measurements have been taken to monitor ozone buildup

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

within the chamber as a function of specific air cleaner operation. Work is in progress on the removal of total spores and pollen, to be followed by viable fungal spores. Also, two air cleaners have been placed in a home and office situation for the extended use study.

With respect to contaminant removal, the data reveal poor effectiveness in air cleaner performance on formaldehyde removal. Air cleaners without sorbent had no effect on gaseous contaminant removal. The clean air delivery rates (CADRs) for tobacco smoke (particulate) removal showed a broad variance depending on particular units. In general, HEPA and electrostatic units were most effective in the removal of particulates.

A technical paper on "The Use of Ozone Generators for the Control of Indoor Air Contaminants in an Occupied Environment" will be presented September 6, 1991 at the ASHRAE IAQ '91 Healthy Buildings Conference in Washington, D.C. Project is on schedule.

JANUARY, 1992

The above presentation was made at the ASHRAE Conference in Washington. Laboratory studies and data evaluations for the project are being completed. We await the submission of the final report.

SEPTEMBER, 1992

E. Levetin presented microbiological data at the Meeting of the American Academy of Allergy and Immunology in March '92 in Orlando, Florida. Sensory data evaluation set project timetable back. We await the submission of the final report.

MARCH, 1993

The primary objective of this study was to test portable indoor air cleaning technologies as to their individual effectiveness in removing dust particulates, tobacco smoke particulate and vapor phase constituents (nicotine and vinyl pyridine), viable and total fungal spores, pollen, and gaseous contaminants (carbon monoxide, nitrogen dioxide, and formaldehyde), within a test chamber per Association of Home Appliance Manufacturers (AHAM) specs.

Three brands of portable air cleaning systems with HEPA filters, three with electrostatic precipitators (EP), two with electret filters (EF), two with ionizers (ION), one containing both EF and ION, and two ozone generators (OZ) were tested. Many of the systems incorporated some degree of sorbent within the filtration configuration. Experiments were conducted individually to discern the air cleaners' effectiveness at specific contaminant removal. Normal decay curves were plotted for each contaminant to enable calculation of Clean Air Delivery Rates (CADR's) and system efficiencies. Cleaners utilizing electrostatic precipitators were the most efficient with respect to particulates (smoke, dust, spores, pollen), closely followed by HEPA and electret filter systems. Ion and

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ozone systems were least effective in reducing the particulate contaminants. Only systems which included sufficient sorbent materials (i.e., activated carbon or potassium permanganate, (with respect to formaldehyde)) proved to be marginally effective at reducing concentrations of gaseous contaminants (nitrogen dioxide, formaldehyde, vinyl pyridine) within the chamber. The air cleaners were least effective at removing carbon monoxide and nicotine.

The testing protocol (modified AHAM standards) for evaluation of the air cleaning systems concentrated only on the initial performance of the system. Two of the filter technologies (HEPA and EP) that proved to be the most effective at removing tobacco smoke particulate in chamber experiments were placed in typical home and office environments to study changes in effectiveness with use. Both systems displayed significant reductions in CADR's after 800 hours of operation in the respective environments.

Two panels composed of five people each participated in sensory testing to determine panel responses to three sets of conditions: (1) tobacco smoke with air cleaner in operation, (2) smoke with no air cleaner in operation, and (3) no smoke, no air cleaner in operation. The sensory testing was conducted to discern potential correlation between human perceptive response and measured air cleaner performance (with respect to tobacco smoke removal). The results of the sensory data analysis indicated that an electret filter (EF) loaded with carbon sorbent received the best ratings across the dimensions of odor strength, nasal irritation, eye irritation, and overall air acceptability. A HEPA system was the only other air cleaner producing statistically significant results on overall air acceptability.

Associated Manuscripts and Abstracts/Presentations

1. Shaughnessy, R.J., Levetin, E., and Sublette, K. "Effectiveness of Portable Indoor Air Cleaners in Particulate and Gaseous Contaminant Removal," to be presented at Indoor Air '93, Helsinki, Finland, July 4-8, 1993.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Genotoxicity of Epoxide-Induced 3-Hydroxyalkyl Uracil

PI: Jerome J. Solomon, Ph.D.
New York University Medical Center
Department of Environmental Medicine

The investigators will test the hypothesis that 3-hydroxyalkyl uracil is the critical premutagenic lesion produced by aliphatic epoxides in vivo. The results will address the mechanisms of mutagenesis and cancer induction by alkenes and will permit an evaluation of the suitability of 3-hydroxyalkyl uracil adducts in DNA as markers of exposure to, and genotoxic risk from, alkenes.

Contract No.	90-12	90-12A	90-12B
Contract Execution Date	6/12/90	6/17/91	6/17/92
Contract End Date	6/30/91	6/16/92	6/16/93
No Cost Extension			12/31/94
Budget	$237,749	$248,160	$241,944
Budget Amendment			
Five month report due	11/90	11/91	12/92
Five month report received	12/10/90	12/91	12/92
Site visit (anticipated)			
Site visit (conducted)	6/26/90		
Ten month report due	4/91	5/92	5/93
Ten month report received	5/6/91	5/11/92	
Continuation approved	6/17/91	6/92	

STATUS: August 1991

Project is on schedule. PI has progressed on the mechanism of hydrolytic deamination of the propylene oxide adduct, 3-hydroxyalkyl-dCyd. The final step of his suggested mechanism is base-catalyzed ring opening to form 3-hydroxyalkyl-dUrd. PI has progressed extensively on determining the DNA adducts which form after in vitro reaction of ethylene oxide with calf thymus DNA. In vivo exposures to propylene oxide have been delayed because of difficulties experienced by the chemical supplier and PI in synthesizing tritiated PO with sufficient specific activity. Development of a DNA repair assay to study the repair of 3-hydroxyalkyl-dUrd lesions by DNA glycosylases is complete and operational in PI's lab.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

STATUS: January 1992

DNA adducts in vitro - Alkylation at N-3 of dCyd by EO under physiological conditions results in rapid hydrolytic deamination of 3-HE-dCyd to 3-HE-dUrd mechanistically involving the hydroxyl group on the alkyl side chain which forms after epoxide alkylation. Hydrolysis experiments to determine in vitro half-life for hydrolytic deamination of 3-hydroxyalkyl cytosine adducts and to measure the pattern and persistence of DNA adducts after in vivo exposure to epoxides and olefin precursors are nearly complete.
DNA adducts in vivo - Preliminary results of persistence studies with PO show that the binding of tritiated PO to nasal cavity DNA persists with a half life of 2.3 days. Clearance of PO DNA adducts from trachea or lung is very slow.
Mutagenesis of single-stranded M13 DNA by PO - All 68 sequenced independent PO-induced mutants in M13/C141 phage DNA show sequence changes at either (or both) of the first two Cs in the target codon (pro,CCC) which result in an amino acid substitution at this site. There are significant differences in the spectrum of mutations observed after transfection of PO-treated single-stranded DNA into E. coli host cells with different DNA repair backgrounds. Relative survival and mutagenesis of PO-treated DNA experiments show that some form of mutagenic damage is repaired by uracil glycosylase which is active in wild type cells but not in ung$^-$ cells.
DNA replication - Studies suggest that alkylation of the central hydrogen bonding site (N-3) of thymidine in DNA is biologically significant and may contribute to the cytotoxic, mutagenic and carcinaogenic processes by alkylating agents.
Site-specific mutagenesis studies and DNA repair studies of 3-hydroxyalkyl-dURD are underway.

STATUS: September 1992

Progress is very good. PI is consistently productive.
In vitro mutagenesis and DNA repair - PO forms adducts at dCyd residues which rapidly deaminate to give 3-HP-dUrd residues. PO is toxic to E. Coli and toxicity is greater in cells which lack either uracil glycosylase activity or nucleotide excision repair (UvrA$^-$). PO can induce mutations at C-residues. Therefore, 3-HP-dUrd lesions are likely to be mutagenic. Mutagenesis is dependent on SOS processing of the lesions. The mutagenic spectrum depends on the repair background of the host cells. The role of repair in the mutagenesis of 3-HP-dUrd lesions is still unclear.
DNA adducts from in vivo inhalation exposure to tritiated PO - Analysis of exposures using concentration/response protocols demonstrated that there is a gradient in the binding of tritiated PO from the upper to the lower airways. Tritium content of DNA in nasal airway:trachea:lung = 6:2:1.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

STATUS: March 1993

DNA Adducts from In Vivo Inhalation Exposure to Tritiated PO: There appears to be a plateau concentration for the formation of DNA adducts in nasal, tracheal, and lung mucosa. Binding of tritiated PO to nasal cavity DNA decreases with biexponential kinetics. Initial phase is rapid. Clearance of PO adducts from trachea and lung is very slow.
Mutagenesis of single-stranded M13 DNA by PO: PO induces a higher frequency of base substitution mutations than frameshift or deletion mutations.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Solomon JJ

Publications, Abstracts, and Presentations supported by CIAR

1. Solomon JJ, F Li, F Mukai, and A Segal. 1991. Characterization and quantitation of in vitro DNA adducts of ethylene oxide. Hydroxyethylation at N-3 of cytosine results in a rapid hydrolytic deamination to a uracil adduct. Presented at Environmental Mutagen Society Annual Meeting, Orlando, FL. April 6-11.

2. Li F, A Segal and JJ Solomon. 1992. In Vitro Reaction of Ethylene Oxide with DNA and Characterization of Adducts. Chem Biol Interactions. 83:35-54.

3. Solomon JJ. 3-Hydroxyalkyl uracil: an epoxide-induced DNA lesion. Presented to Department of Pharmacological Sciences, State University of New York at Stony Brook, October 8, 1991.

4. Snow ET and JJ Solomon. 1992. Propylene Oxide Adducts at Cytosine Residues are Mutagenic Under SOS Conditions in E. Coli. Environmental Mutagen Society Annual Meeting, Reno/Sparks, NV, March 15-19, 1992. Abstract 14, Environ and Mol Mutagen, 19, Suppl. 20:59.

5. Solomon JJ, J Donahue, U. Singh, U Kher and OS Bhanot. 1992. Biological significance of alkylation at N3 of pyrimidines. Presented at the Gordon Research Conference on Mutagenesis, Plymouth State College, North Plymouth, NH, June 26-July 3.

6. Bhanot OS and JJ Solomon. 1993. The role of mutagenic metal ions in mediating in vitro mispairing by alkylpyrimidines. Invited lecture for the Second International Meeting on the Molecular Mechanisms of Metal Toxicity and Carcinogenicity, Madonna di Campilio, Italy, January 10-17.

7. Solomon JJ. 1992. DNA adducts of lactones, sultones, acylating agents and acrylic compounds. Invited chapter for IARC Monograph on DNA adducts of carcinogenic and mutagenic agents: chemistry, identification and biological significance.

8. Solomon JJ, US Singh and A. Segal. 1992. In vitro reactions of 2-cyanoethylene oxide with calf thymus DNA. Submitted to Chem.-Biol. Interactions.

9. Singh J., ET Snow and JJ Solomon. 1993. Propylene oxide induces SOS dependent mutagenesis at cytosines in single-stranded M13 DNA. Submitted for the 1993 annual meeting of the American Association for Cancer Research.

10. Bhanot OS, U Singh, U Kher and JJ Solomon. 1993. Ethylene oxide-induced N3-hydroxyethyl-deoxyuridine inhibits in vitro DNA replication. Submitted for the 1993 annual meeting of the American Association for Cancer Research.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Human Inhalability of Ultralarge Airborne Particles

PI: **David L. Swift, Ph.D.**
The Johns Hopkins University School of Hygiene & Public Health
Department of Environmental Health Sciences

This investigation proposes to test whether ultralarge particles (25-250 um diameter) are accessible to the nasal and oral airways and can deposit in these airways at sites which have acute or chronic health consequences, by carrying out controlled particle trajectory and deposition experiments at still or near still air flow conditions, first in mannikins and then in normal adult human subjects. The results of these experimental studies should be incorporated into dosimetric models and particle sampling protocols to provide a framework for predicting size related aerosol exposure effects for indoor environments.

Contract No.	93-02		
Contract Exec Date	2/2/93		
Contract End Date	2/2/94		
No Cost Extension			
Budget	$91,765	$95,814	$103,598
Budget Amendment			
Five month report due	7/2/93		
Five month report rec			
Site visit (anticipated)			
Site visit (conducted)			
Ten month report due	12/2/93		
Ten month report rec			
Continuation approved			

STATUS: MARCH, 1993

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

New Bioaerosol Sampling Techniques for Indoor Air Environments

PI: Klaus Willeke, Ph.D.
University of Cincinnati Medical Center
Department of Environmental Health

Portable personal and stationary area samplers with the same inlet and aerosol impaction stage will be developed, laboratory-evaluated, and field-tested to permit intercomparison of data on microorganism species identification and quantification of colony forming units.

Contract No.	90-16	90-16A	90-16B
Contract Execution Date	5/29/90	6/4/91	6/4/92
Contract End Date	5/29/91	6/4/92	6/4/93
No Cost Extension			
Budget	$171,335	$167,378	$184,599
Budget Amendment			
Five month report due	10/29/90	11/4/91	11/4/92
Five month report rec	11/09/90	11/18/91	11/9/92
Site visit (anticipated)			4/15/93
Site visit (conducted)	12/19/90		8/10/92
Ten month report due	3/29/91	4/4/92	
Ten month report rec	4/91	4/10/92	
Final report due			6/4/93
Final report rec			
Continuation approved			

STATUS: August 1991

Several commercially available bioaerosol samplers have been analyzed as to their operating principles and the different elements of the bioaerosol sampling process. Sampling efficiency has measured how well the inlet of a sampler draws in particles without being affected by the particles' sizes, shapes, velocities and travel directions. Collection efficiency has measured how well the sampler deposits the particles without being

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affected by their physical properties. Biological efficiency indicates the ability of the sampler to maintain the microbial viability and prevent cell damage during sampling.

Borrowing from techniques used in the fiels of industrial hygiene, the problems of quantitative bias due to statistical considerations, counting procedures, sample surface densities and sampling time can be minimized by using proper sampling procedures to obtain optimal samples. Guidelines for bioaerosol sampling have been revised and have been well-received at recent meeting presentations.

An easy-to-make virtual impactor has been developed to be utilized as an accessory to optical particle counters to optimize their sensitivity to larger particles. Work on the new design for the bioaerosol sampler, however, is progressing slowly, due to the optimal sampling times and optimal densities not being resolved as yet.

JANUARY, 1992

The PI has designed and built a sampler with three interchangeable inlets, which is being used to study the biological survival efficiency during sampling. Using the recently acquired biosafety hood, Pseudomonas fluorescens bacteria are nebulized and sampled by the new device. The experimental setup has been designed so that the biological viability can be studied for different stresses during impaction and different desiccation times after collection on the substrate. The number of incoming bacteria is counted by a laser-aerosol spectrometer (LAS). The number of bacteria that forms colonies on the substrate will be compared with the number of incoming bacteria from which the bacterial collection efficiency will be determined. Only a small fraction of the incoming bacteria is expected to be counted by the conventional colony-forming count technique. The results of this study may have a major impact on the interpretation of data from presently-available bioaerosol samplers and will provide design criteria for new ones.

In addition to the collection efficiency of available samplers, the PI is now studying the inlet efficiency of available samplers and is finding that there are considerable differences.

To avoid the collection of many inert dust particles for every microbe collected under normal sampling conditions, sampling times are often shortened. This attempt to prevent the masking of the microbes by the inert dust particles may result in a very low number of microbes in a given microscopic field. The PI currently is analyzing this effect with respect to any increase in the statistical uncertainty of the reported microbial counts. Project is essentially on schedule.

Associated Manuscripts and Abstracts/Presentations

1. "Performance of Bioaerosol Samplers: Collection Characteristics and Sampler Design Considerations," A. Nevalainen, J. Pastuszka, F.

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Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Liebhaber and K. Willeke, Atmospheric Environment, in print.

2. "Low-Cost Virtual Impactor for Large-Particle Amplification in Optical Particle Counters," F.B. Liebhaber, M. Lehtimaki and K. Willeke, Aerosol Science and Technology, 15:208-213, 1991.

3. "Bioaerosol Sampling," A. Nevalainen, K. Willeke, F. Liebhaber, J. Pastuszka, H. Burge and E. Henningson, in Aerosol Measurement: Principles, Techniques and Applications, K. Willeke and P. Baron (eds.), Van Nostrand Reinhold, New York, 1992.

4. "Bioaerosol Sampling," K. Willeke, in Guidelines for the Assessment of Bioaerosols with Indoor Environment, American Conference of Governmental Industrial Hygienists.

5. "Sampling for Bioaerosols: Simple Criteria for Comparing Sampler Performance," J. Pastuszka, A. Nevalainen, F. Liebhaber and K. Willeke, Abstract No. 222, American Industrial Hygiene Conference and Exhibition in Salt Lake City, Utah, May 18-24, 1991.

6. "Field Evaluations of Sampling Methods for Airborne Bacteria," A. Nevalainen and K. Willeke, Abstract No. 223, ibid.

7. "The Design of Field-Constructed Virtual Impactors Used for Sampling Aerosols," F.B. Liebhaber, M. Lehtimaki and K. Willeke. Abstract No. 327, ibid.

8. "Collection Characteristics of Bioaerosol Samplers," Pan-American Aerobiology Association Annual Symposium in Ann Arbor, Michigan, June 19-21, 1991.

9. "Sampling Time of Bioaerosol Samplers," F. Liebhaber, A. Nevalainen, J. Pastuszka, M. Thompson and K. Willeke, ibid.

10. "Application of Aerosol Sampling Techniques to Emerging Health Issues," K. Willeke, First Symposium on Pollution and Health Effects of Aerosols, Taipei, Taiwan, September 10-12, 1991.

11. "Sampling Times of Bioaerosol Samplers," F. Liebhaber, A. Nevalainen, J. Pastuszka, A. Juozaitis and K. Willeke, Abstract No. 11A.1, Annual American Association for Aerosol Research, Grand Traverse, Michigan, October 7-11, 1991.

12. "Collection Characteristics of Bioaerosol Samplers," K. Willeke, A. Juozaitis, A. Nevalainen, F. Liebhaber and J. Pastuszka, Abstract No. 11B.2, ibid.

13. K. Willeke, Annual Short Course on Bioaerosols in Ann Arbor, Michigan, October 28-30, 1991.

SEPTEMBER, 1992

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The focus on the physical aspects of bioaerosol sampling has included the aspiration of bioaerosols from the environment into an inlet, their transmission through the inlet, and efficient collection on a substrate within a relevant period of time that yields neither too high nor too low a particle density on the substrate for enumeration. This work has resulted in manuscripts on inlet efficiency, collection efficiency, sampling time, and the masking effect of deposited microorganisms.

After studying bioaerosol impaction with an experimental impactor, three new bioaerosol samplers have been designed and constructed: one with impaction onto a hard slide, one with impaction onto a soft agar medium, and one with impaction (also referred to as impingement) into a liquid. All three have the same impaction stage, consisting of a narrow 14.2 mm slot with a 60 degree tapered inlet, so that the physical sampling geometry is identical in each sampler. The slot width can be changed to 0.2, 0.3, and 0.4 mm.

The PI has been given a sabbatical leave to perform research in Munich, Germany, for two months in each of the three quarters of academic year 1992-93, starting September 1, 1992. He will collaborate with Professor R. Niessner of the University of Munich, who has been working on new methods of measuring indoor and outdoor pollutants, and also will visit and interact with other European institutions that are active in indoor research. In order to keep his research efforts going smoothly at the University of Cincinnati, Dr. Willeke specifically chose to be in Europe only for short intervals and thus will make three round trips to Europe, one per quarter. During his absence, Dr. Grinshpun will coordinate the research project and maintain it on schedule.

Associated Manuscripts and Abstracts/Presentations

1. Nevalainen, A., Pastuszka, J., Liebhaber, F. and Willeke, K. "Performance of Bioaerosol Samplers: Collection Characteristics and Sampler Design Considerations," Atmospheric Environment, 26A: 531-540 (1992).

2. Willeke, K., et al. "Application of Aerosol Sampling Techniques to Emerging Health Issues," Proceedings of the First Symposium on Pollution and Health Effects of Aerosols, Taipei, Taiwan, 508-515 (1991).

3. Willeke, K. "Characterization of Bioaerosol Samplers," lecture given at the EPA Research Center in Triangle Park, NC, December 18, 1991.

4. "Inlet Characteristics of Bioaerosol Samplers," in preparation for Journal of Aerosol Science.

5. "Universal Equation for Aerosol Aspiration from Calm and Moving Air," in preparation for Atmospheric Environment.

6. "Maximal Surface Density and Probability of Masking in Bioaerosol Microscope Counting," in preparation with Janet Macher and colleagues

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in Berkeley, California.

7. "Design and Performance of a New Bioaerosol Sampler for Indoor Air Environments," in preparation.

8. Thompson, M.W., Donnelly, J., Grinshpun, S.A., Juozaitis, A. and Willeke, K. "Method for Determining the Viable Fraction of Bioaerosols," submitted to American Industrial Hygiene Association Journal.

MARCH, 1993

With particular emphasis on the microbiological evaluation, the PI has applied the newly developed test methods to his new sampling devices and found optimal collection media as well as optimal sampling conditions for all three samplers.

The PI has conducted experiments first wuth biologically inert particles, and then with bacteria. All three of the new samplers were tested and then their performances were compared to those of several commonly used bioaerosol samplers. Collection efficiencies for all samplers were measured. The recovery of microorganisms was found to be superior with his impinger and agar slide impactor (close to 100%) than with the commercial devices tested.

With his methods of counting bioaerosol particles physically and simultaneously measuring their recovery after incubation, the PI was able to determine the bacterial recovery on an absolute basis. In addition, the comparison of the samplers' performances found with inert PSL particles to those found with bacteria of the same size enabled him to determine the survivability of microorganisms in bioaerosol samplers.

The newly-developed Agar Slide Impactor and the Liquid Impinger were tested in the field. Measurements of viable bioaerosol concentration were carried out in a variety of indoor air environments where different kinds of bioaerosol contaminants and different bacterial concentrations were expected. Most measurements were performed at the University of Cincinnati buildings (at the offices, auditorium, classroom, animal room, rest rooms, and laboratories). In addition, private homes were studied as well.

The analysis of the results obtained in the field study shows that the newly-designed Agar Slide Impactor and the Liquid Impinger demonstrated the higher number of recovered microorganisms than the commercial bioaerosol samplers used in the tests. This result was confirmed in a variety of environmental sites at various microbial concentrations. Furthermore, the counts obtained at the same environment with the UC Agar Slide Impactor and the UC Liquid Impinger were found to be approximately the same. Based on these results, the PI concludes that the field tests confirm the results of the previously conducted laboratory evaluation of the new bioaerosol samplers and proved their advantage over the commercial instruments. Project is on schedule.

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Associated Manuscripts and Abstracts/Presentations

1. Grinshpun, S.A., Chang, C.W., Juozaitis, A., Liebhaber, F., Thompson, M. and Willeke, K. "Sampling Efficiency of Bioaerosol Samplers," Abstract No. 293. American Industrial Hygiene Conference and Exhibition, Boston, MA, May 30-June 5, 1992, pp.85-86.

2. Chang, C.W., Grinshpun, S.A., Juozaitis, A., Liebhaber, F., Nevalainen, A., Thompson, M. and Willeke, K. "Inlet Sampling Efficiency of Bioaerosol Samplers," Symposium of the Pan-American Aerobiology Association, "Aerobiology 1992," University of Toronto, Scarborough, Canada, June 9-11, 1992.

3. Willeke, K., Grinshpun, S.A., Chang, C.W., Juozaitis, A., Liebhaber, F., Nevalainen, A. and Thompson, M. "Inlet Sampling Efficiency of Bioaerosol Samplers," European Aerosol Conference, Oxford, U.K., September 5-9, 1992.

4. Grinshpun, S.A., Chang, C.W., Kalatoor, S., Donnelly, J. and Willeke, K. "New Model of Inlet Sampling Efficiency and its Application to Bioaerosol Samplers," Abstract No. 3B.1. 11th Annual Meeting of the American Association for Aerosol Research, San Francisco, CA, October 12-16, 1992, p.88.

5. Willeke, K. Invited lectures at the Occupational Health Seminar, Yonsei University, Seoul, Korea and the International Aerosol Symposium, Ohta, Japan, August 1992.

2504065485

Source: https://www.industrydocuments.ucsf.edu/docs/jqhl0000

Neuroendocrine Lung Cancer: Mechanistic Studies

PI: Hanspeter R. Witschi, M.D.
University of California - Davis
Department of Veterinary Medicine

The investigators will analyze oncogene expression in lung cancers induced in hamsters during tumor development and in formed tumors. The understanding of early patterns of gene expression will allow for accurate prediction of ultimate tumor type.

Contract No.	90-24	90-24A	90-24B
Contract Execution Date	9/1/90	6/28/91	6/28/92
Contract End Date	9/1/91	6/27/92	6/27/93
No Cost Extension			
Budget	$166,099	$169,159	$179,200
Budget Amendment			
Five month report due	2/1/91	12/91	12/92
Five month report received	2/15/91	1/92	
Site visit (anticipated)			
Site visit (conducted)	5/20/91		
Ten month report due	7/1/91	5/92	FINAL 6/93
Ten month report received	5/30/91	9/92	
Continuation approved	6/28/91	9/92	

STATUS: August 1991

PI has been unable to produce small cell lung tumors in hamsters exposed to DEN and NNK (unable to reproduce results obtained in former work at Oak Ridge). PI has been able to produce adenomas and is proceeding with original work plan to investigate tumor formation mechanisms. PI has determined c-ki-ras expression using PCR technique, developed a new Northern blot protocol, tested p53 primers, and prepared RB primers for amplification of hamster cDNA.

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STATUS: January 1992

Serial sacrifice study with hamsters treated with NNK was begun in May. NNK injections and oxygen exposure were stopped 28 weeks later. Animals were sacrificed 3, 6, 9, 12, and 15 weeks after beginning treatment. No tumors were found in these groups. Determination of tumor incidence and harvesting of tumor material for molecular biological analysis from the longest exposed groups will occur in February. Investigators have developed a Northern blot methodology for their studies using a regenerating liver model.
The investigators have detected and confirmed the expression of Syrian Golden hamster c-Ki-ras 2 and p53 by amplification of reverse transcribed RNA extracted from fresh and frozen tissue, and by predicted size analysis, probing with a biotin labelled probe and by direct sequencing. In 6 NNK induced hamster non small cell lung cancer tumors examined, 50% were found to have c-Ki-ras 2 mutations at the 12th codon in the 2nd position. No mutations were found in the p53 message in any of the tumors examined.

STATUS: September 1992

Serial sacrifice study of hamsters treated with NNK - All animals had grossly visible lung tumors. Lung tumors of hyperoxia-exposed animals were smaller than air-exposed. From preliminary experiments with tissue from NNK treated hamsters, kept in air or in hyperoxia, NNK-induced carcinogenesis in the hamster results in characteristic alterations of Ki-ras but may not necessarily involve the p53 gene at this stage of tumorigenesis (28 - 40 weeks after the start of NNK administration).

STATUS: March 1993

Work designed to address original specific aim has been fully published in the open literature.
Having developed the techniques to discover point mutations in the K-ras oncogene, PI has begun to look for different K-ras mutations in lung tumors that grew under different conditions (different inducing carcinogens) or are presumably of different cellular origin. Experiments are underway in which two different strains of mice are treated with two different carcinogens (urethan and 3-methylcholanthrene). The different treatments and strains are expected to yield information on the specificity of K-ras mutations in murine lung tumors.

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Witschi HP

Publications, Abstracts, and Presentations supported by CIAR

1. Ning H, VIC Oreffo, PH Gumerlock, and H Witschi. 1991. Increased c-Ki-ras expression in hamster lung exposed to N-nitrosodiethylamine and hyperoxia as detected by polymerase chain reaction. Cancer Letters 59:75-80.

2. Oreffo VIC, PH Gumerlock and HP Witschi. 1991. Hamster ras family gene expression detected by the polymerase chain reaction. Abstract, Society of Toxicology 1991 Annual Meeting, Dallas, TX, Feb. 25 - Mar. 1.

3. Oreffo VIC, H Lin, PH Gumerlock, and HP Witschi. 1992. Detection of point mutations in hamster non small cell lung cancer induced by NNK. The Toxicologist 12:229.

4. Oreffo VIC, HW Lin, PH Gumerlock, SA Kraegel, and HP Witschi. 1992. Mutational analysis of a dominant oncogene (c-Ki-ras-2) and a tumor suppressor gene (p53) in hamster lung tumorigenesis. Molecular Carcinogenesis. 6:199-202.

5. Oreffo VIC, HW Lin, R Padmanabhan, and HP Witschi. 1993. K-ras and p53 point mutations in 4-(nitrosamino)-1-(3-pyridyl)-1-butanone induced hamster lung tumors. Carcinogenesis. In press (March issue).

6. Rajini PS, VIC Oreffo, HW Lin, and HP Witschi. 1993. Induction of K-ras mutations in hamster lung by 4-(nitrosamino)-1-(3-pyridyl)-1-butanone (NNK). The Toxicologist 13:85 (1993 Annual SOT Meeting, New Orleans, LA).

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